CHAPTER II

REVIEW OF LITERATURE
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The Literature Review is a significant look at the existing research that is important to the work that you are carrying out. The Literature Review further means, it is the documentation of research work. Main aim of Review of Literature is to find out the problems already investigated and which need further investigation. It is a systematic and critical review of scholarly literature on a particular topic. Review of Literature is a survey of everything that has been written about a particular topic, theory or research question. It is a systematic and logical documentation of a complete review of the published and unpublished work gathered from various secondary data in the area of interest of the researcher to gain background knowledge of research topic.

It expands knowledge base. It reveals research questions - gaps in current knowledge (Gaps between current knowledge and past knowledge). Through Literature Review we have to bridge these gaps and increase the breadth of knowledge area of research.

The Importance of a Literature Review in Research Writing:
Doing a careful and thorough literature review is essential at any level—the basic homework that is assumed done vigilantly, a given fact in the research work titled

“A study of organizational Ergonomics Practices with special reference to IT and Banking Sector in Pune City.”

By providing a literature review, usually offered in the introduction before thesis statement, it is important to tell your reader that you have not neglected the essentials of doing a explore because a literature review
not only surveys what researches have been done in the past on your research topic but it also appraises, encapsulate, compares and difference, and compare various scholarly books, research articles, and other relevant sources that are directly related to your current research. Given such fundamental nature of providing a literature review becomes very important to understand the variables in details.

A Literature Review sharpens your research focus that is why when researcher has gone through 100 reviews (articles, white papers, survey reports, dissertation, abstracts, websites, books, journals) researcher got an area of scope to do research. In the research the dependent variable is Ergonomics Practices whereas the independent variable is Working Conditions, Office Furniture.

2.1 REVIEW OF LITERATURE ON RESEARCH PAPER

Rothmore, P., Aylward, P., Oakman, J., Tappin, D., Gray, J., &Kamon, J.(2017). The Stage of Change approach has been proposed as a method to improve the implementation of ergonomics advice. However, despite evidence for its efficacy there is little confirmation to suggest it has been adopted by ergonomics guide. This paper examine barriers and facilitators to the implementation, monitoring and effectiveness of ergonomics advice and the implementation of the SOC approach in a series of center groups and a successive survey of members of the Human Factors Societies of Australia and New Zealand. A proposed SOC assessment tool industrial for use by ergonomics practitioners is offered. Findings from this study suggest the limited application of a SOC based approach to work-related musculoskeletal injury prevention by ergonomics practitioners is due to the absence of a appropriate tool in the ergonomists' catalog, the need for training in this approach, and their limited access to relevant research findings. The final translation of the
SOC assessment tool into professional ergonomics practice will require accessible demonstration of its real-world usability to practitioners and the training of ergonomics practitioners in its application.

Rupa Sheth Valdez, Kerry Margaret McGuire, A. Joy Rivera (2017) The objective of this systematic review was to understand the current state of E/HF qualitative research in health care and to appeal effects for future efforts. This systematic review identified ninety eight qualitative research papers published between January 2005 and August 2015 in the seven journals endorsed by the IEA. The majority of the studies were conducted in hospitals and outpatient clinics, were focused on the work of formal health care professionals, and were categorized as cognitive or organizational ergonomics. Interviews, focus groups, and observations were the most prevalent forms of data collection. Few studies employed a formal approach to qualitative inquiry. Significant opportunities remain to enhance the use of qualitative research to advance systems thinking within health care.

Liu, Q., Ren, J, Zhang, Q., & Hua, M. (2017) This paper aimed to identify the reach capabilities of Twenty six seated subjects considering the reach difficulty, orientation and other possible factors, and to find a system to model the minimum reach capability surfaces for fixed and adjustable seats. The reach capability radius was used as a measure of the reach ability and hypothetically modeled. Created on the experiment data of seated reach, the distribution of the reach capability radius was analyzed. The strategy to select the least reach envelopes was created to accommodate adequate percentage of the target population for both fixed and adjustable seats. For adjustable seats, a method was established to grow the scope capability data from the tested individual reach ability data by introducing seating position models to relocate the individual
reach capability data. An application case was realized based on the cab covering data of a mini-van, and the minimum reach envelopes of different complexity were created and validated to accommodate 90% of the target population.

**Peres, S. C., Mehta, R. K., & Ritchey, P. (2017)** The researcher focus on software utilizing interaction designs that require extensive exhausted or get on of image may increase consumer risks for upper limit CTD. The purpose of this research is to develop a SEAT for assessing the risks of software interaction designs and facilitate improvement of those risks. A twenty eight item self-report quantify was developed by merge and modifying items from accessible industrial ergonomic tools. Data were collected from one hundred & sixty six participants after they completed four different tasks that diverse by method of input and type of task. Principal component analysis found distinct factors associated with stress and damage. Repeated measures analyses of variance showed that participants could categorize the different damage induced by the input methods and tasks. However, participants' ability to distinguish between the stressors associated with that damage was mixed. Further validation of the SEAT is necessary but these results indicate that the SEAT may be a viable method of assessing ergonomics risks presented by software design.

**Ardalan shariat, Shamsul bahrimohdtamrin, Mahmoudanaee (2017)**

Paper focus on the various issue of work place injury in Lower back, neck and shoulder pain are the most prevalent musculoskeletal problems disturbing office workers global. More than a few hypotheses regarding the essential machines and the maintenance behind office work-related musculoskeletal disorders have been vacant. There is some
evidence, based on epidemiological learning as well as studies upon smaller groups of subjects, that individuals who sit and work for a long time not only show cognitive injury at the workplace, but also suffer from inferior and split daytime sleep, in addition to increased risks of rising various psychosomatic, physiological and medical impairments and musculoskeletal anarchy. The related physical mechanisms behind musculoskeletal disorders are discussed in the background of new result. The main reason, as well as varying levels in strictness of musculoskeletal disorders, not to point out the link between such disorders in the neck, shoulder and lower back regions and physical activity among office employees are also confirmed. The main objective of this review paper is to conduct a systematic review to identify musculoskeletal of this review indicate that the musculoskeletal disorder is a critical issue among office workers and the main reason is associated to the lack of physical program as well as the topics' sedentary lifestyle. The researcher focus on the office workers those are working on computers for longer period.

The ever rising use of computers in diverse fields has led to rise in musculoskeletal problems related to its procedure. Apart from ergonomic design aspects, quantity of psychosocial workplace factors have emerged that may influence the biomechanical load or the reactions to workplace stress. The National Institute for Occupational Safety and Health (NIOSH, 1997)[sup] [1] has outlined five psychosocial factors that are related to back and upper extremity disorders. i.e., job satisfaction; intensify workload, repetitive work, job control and community support. The present article, which is a part of broader cross sectional study done on four hundred nineteen subjects who work on computer for fluctuating period of time, helps to recognize the relationship between various
psychosocial workplace factors and occurrence of these problems. Researcher focus on the computer users and their MSDs problem.

QomariyatusSholihaha, AprizalSatriaHanafib, Ahmad AlimBachric, RahmiFauziad (2016) The fisheries sector is one of the high risk jobs. Fishermen often have to face the fatigue risks. The main cause that emerge the impact of their workloads is the way they behave, that pay less attention to ergonomic principles. The purpose of this training is to explain the effect of analysis ergonomic work towards working information of musculoskeletal disorders and grievances at Saijaan Fishermen Association. The research used a method of Pre-Investigational with one group pre-test-post-test design. This design used a single group, with the main characteristic was to compare the group and individual without any group comparison. The research population was the Fishermen Association Saijaan. Samples were taken from 186 fishermen. Wilcoxon test results showed that there were differences in the Fisherman knowledge before and after the counseling activities with and differences in musculoskeletal disorders at Fisherman's complaints before and after the counseling activities. Researcher study about the fisherman problems. Done experiment before after situation in the research study.

Nace Pusnika, Anja Podlesek, Klementina Mozinaa Daily (2016) Contents presented on television screen are in most cases equipped with titles, for example the names and surnames of presented people, data about the location, subtitles or different advertisements. It is commonly understood that upper-case letters are more useful (likened to lower-case letters) for placing short titles. The aim of the research was to determine the differences in recognition and reproduction times of short titles in
various experimental conditions (especially the difference between lower- and upper-case letters when the x-height of lower-case letters is increased to the main size of upper-case letters). We were interested in how lower-case letters are comparable to upper-case letters in appreciation and data processing. Five typefaces were included in the research, i.e. Calibri, Georgia, Swiss 721, Trebuchet and Verdana. Three-letter words were presented in lower- and upper-case, covering a analogous area in four different positions on the screen. The analysis of variance showed that the Calibri typeface was recognized and processed faster. The Georgia, Trebuchet and Verdana typefaces showed comparable processing times regardless their letter case. Research study about the how present a word sequences or type on the screen.

Dong Zhou, Jiayu Chen, ChuanLv, QingyuanCao(2016) The study Designers must consider HFE when making decisions from the perspective of maintainability. As an important aspect of maintain that, maintenance gap should be made adequate at the design stage to achieve a convenient maintenance process. A maintenance space evaluation method that believes ergonomics is proposed in this study. By relating free swept capacities and inhibited swept volumes in a virtual environment, maintenance space could be evaluated quantitatively and objectively. The results of the evaluation are attained by merging the principles of ergonomics and maintainability. These results can help designers improve product design such that it fits ergonomics and maintain requirements. A case study is introduced at the close of this research paper to exhibit the feasibility of the proposed method in efficiently evaluating the maintenance space based on the layout design of the product components in the design stage.
Susanna Aromaa, Kaisa Vaananen (2016) In recent years, the use of virtual prototyping has increased in product development processes, especially in the assessment of multipart systems directed at end-users. The purpose of this study was to evaluate the suitability of virtual prototyping to support HFE during the design phase. Two different virtual prototypes were used: augmented reality and virtual environment prototypes of a maintenance platform of a rock crushing machine. Nineteen designers and other stakeholders were asked to assess the correctness of the prototype for HFE evaluation. Results indicate that the system model characteristics and user interface affect the experienced suitability. The VE system was appreciated as being more suitable to support the assessment of brightness, reach, and the use of tools than the AR system. The findings of this study can be used as guidance for implementing virtual prototypes in the product development process.

Mani, Karthik; Provident, Ingrid; Eckel, Emily (2016) giving to researcher Work-related musculoskeletal disorders (WMSDs) related to computer work have become a thoughtful community wellbeing concern. Literature revealed a positive association between computer use and WMSDs. The purpose of this evidence-based pilot project was to provide a series of evidence-based educational sessions on ergonomics to office computer workers to enhance the awareness of risk factors of WMSDs. Seventeen office computer workers who work for the National Board of Certification in Occupational Therapy volunteered for this project. Each participant completed a baseline and post-intervention ergonomics questionnaire and attended six educational sessions. The Rapid Office Strain Assessment and an ergonomics questionnaire were used for data collection. Results: The post-intervention data revealed that eighty nine percent of participants were able to identify a larger number of risk factors and answer more questions correctly in knowledge tests of
the ergonomics questionnaire. Pre- and post-intervention judgments showed changes in work posture and actions (taking rest breaks, participating in exercise, adjusting workstation) of participants of for injury prevention in office settings and recommend that ergonomics education may yield positive data and behavioral changes among computer workers.

Leccese, F; Salvador, G; Rocca, M (2016) Researcher showed in the extensive literature in ergonomics and optometry has indicated that use of computer is closely related with visual problems. The manifestations of visual fatigue phenomena may affect the working behavior and the human-system interaction. The aim of this survey is to identify the normal working conditions and how the eventual visual fatigue phenomena are able to influence the working behavior of CAD users. The results show that 135 out of 150 students report visual fatigue during long CAD sessions, which in most cases leads to complexity in continuing the activity and changing usual working behavior. The results of the questionnaire show that the university students work in highly variable lighting conditions and with little awareness on the luminance allocation on the field of examination. This has highlighted the importance, for VDT workstations, of not limiting the risk analysis to the postural ergonomics (how usually occurs) but extend it to the workplace as a full, study also the ergonomics of figure, which involves different consideration on the natural and false lighting of the workplace and on the uniqueness of the display. A questionnaire was created and submitted to a sample of 150 university students, who attend the Faculty of Engineering of the University of Pisa (Italy). The research questionnaire outcome give you an idea about those university students spend on average seven hours per day at the computer for CAD drafting. Most of the participants work in powerfully lit surroundings, with high
clarity screens and unhelpful polarity. Such conditions because high contrasts in luminance, especially between screen and surfaces that fall within the field of vision. According to the manufacturer, aluminum framework is 50% lighter than traditional steel runway systems allowing for less rolling resistance, enabling users to accomplish tasks with push/pull trolleys. Ergonomic Mat - Grainger introduces the NOTRAX kneeling pad. Pad offers a large work surface with a built-in moving handle for easy transportation. According to Grainger, the silicone-free pad is nonconductive and challenging to petroleum-based material such as oil, fuel and other chemicals. Designed for applications such as gravel, concrete, asphalt, tile and wood flooring, product is ideal for use in various industries. Hand Truck - The Lift Stik Series from CESS I Ergonomics positions loads at a comfortable height to eliminate bending and stretching. Product features oversized ergonomic sponge grip handle for operator comfort, brake lock to ensure safety while loading and unloading, and precise load positioning with zero drift. Push-button remote control is mounted on the handle, and unit also has a coiled cord for remote operation. Product can reportedly handle loads up to 445 lb. Training System - Velocity EHS introduces ErgoAdvocate to its cloud based OSH software platform. System offers a suite of ergonomic assessments, training and evaluation tools, corrective actions, and reporting and tracking metrics. Web-based platform allows user to train thousands of employees at one time, and quickly calculates and stores data for future use. Ergonomist-recommended stretches and instructions, and a countdown timer to help users properly time each stretch. Opt-in reminders are designed to be unobtrusive and are customizable to fit into individual schedules. OSHA-supported setup information helps users learn to set up desk, chair, monitor, mouse and keyboard for enhanced comfort and productivity. Disposable Glove -- The XCEED powder-free nitrile glove from Ansell is ergonomically designed to reduce hand fatigue. Researcher showing the Ideal for workers who
require protection while performing repetitive, intricate tasks, product features textured fingertips for improved grip while the thinner material offers tactical sensitivity and puncture resistance.

Research Gap: Researcher study about the normal working situation and how the eventual visual fatigue phenomenon is able to influence the working activities of CAD users. Researcher study about employee working in the IT and banking sector employee.

Cable, Josh (August 2016) NIOSH Report Offers Tips on Conducting Ergonomic Assessments Purpose of the research articles of the document is to help EHS experts assess working posture for the prevention and control of occupational musculoskeletal disorders. Quantitative or semi quantitative descriptions of posture are inputs to many job-analysis tools applied in MSD prevention and control. Theme arising out of the review is a few tips for recording and analyzing workers' posture include: Record the task from multiple views and encourage the employee to avoid loose-fitting clothing. If possible, have one of those views be at right angles to the plane of the joint movement. Go fast in on limb segments so that the joint of interest is as large as possible in the camera field of view.

Research gap: The researcher focuses on the EHS practitioners only.

Rajinder Kumar, Mooma, Dr. Lakhwinder, Pal singb, Neelam Moomc (2015) Rapid scientific development in the use of automated data has affected both the workers and workplace. In recent years rapid use of computers has changed the work environment drastically. Various factors like personal factors, work related factors (WRF), psycho-social factors (PSF) can result in many health hazards like musculoskeletal disorder (MSD). From the literature review it is observed that the
musculoskeletal disorder is very common among computer user's bank office employees. Objective: The purpose of this paper was to examine the prevalence of musculoskeletal disorder among Computer User Bank Office employees. Material and Method: A self-designed questionnaire based on Nordic musculoskeletal disorder was delivered to sixty computer user employees of state bank of India district Nawanshahr Punjab. Out of which fifty questionnaires were found completely filled and ten questionnaires were found partially filled and thus not included in the study. Association of risk factor was accessed by Logistics regression and ANOVA analysis using SPSS 21. Results: Participants suffering from MSD during the last 12 months reported problem in the low-back pain (40.4%), upper back (39.5%), Neck (38.6%), hand/wrist (36.8%) and shoulder (15.2%). In the present study it was found that age, smoking/drinking habits, bad work postures, job insecurity, unhealthy working conditions also contribute to increase MSD in bank employees. Conclusion: the study showed a high occurrence of disorders in the low-back, upper back neck, hand/wrist, shoulder etc. It is recommended that proper work posture; healthy working conditions must be provided which can make the work easier and more relaxed.

Chen, Yumiao; Wang, Jianping; Yang, Zhongliang. (2015) The purpose of this paper is to provide an overview of the HFE studies for ventilator. This review paper describes and discusses the various factors and methodologies of HFE, for the purpose of better taking into consideration human factors, used in respirator studies and further human-centered product development. Theme arising out of the review many attempts has been made to study human factors for respirators mainly including fit, human performance, well-being, and attitude. Somatic, emotional, and physiological indices of people are tremendously valuable to HFE studies for ventilator. Purpose and
Prejudiced measures were methodologies widely used. Quantitative and qualitative attitudes were adopted to illustrate the human presentation and well-being influenced by respirators. The current researches, this review indicated three particular challenges facing HFE studies of respirator now.

Research gap: This is a first paper in the field of HFE studies for respirator, which will remain helpful to the systematic group of people to start further human-centered research work and product development.

In the this study showing about Comfortable mobile offices Kamp, I; Van Veen, SAT; Vink, P,(2015) A literature review of the ergonomic features of mobile device use in transportation settingsth the aim of this review is providing a framework of the relevant fundamentals for comfortable mobile offices and defining needs for future research. Theme arising out of the review is the use of mobile devices as an addition to or replacement of desktop computers for traditional office work results in more flexibility of workplaces. As an effect transportation time is used for office work and this asks for comfortable mobile offices. This literature review draws on sixty eight papers, theses, reviews and critiques. The agenda is based on existing literature on traditional office ergonomics and comfort literature for different transportation modes like trains, buses, airplanes and cars.

Research gap: Important topics for future research are the effect on the employee and the environment of the ability and demand of working anywhere, and the requirements for the physical aspects of mobile offices.
Scottish Business Insider (2015) Author focus on this Employee feel valued for a more effective workplace Purpose of the research articles is Employee Engagement research carried out by portioned coffee experts Nespresso and research company Comes found that nearly nine in ten (87%) UK workers across five key sectors, Creative /communications, Technology/IT, HR, Financial and Legal, highlighted the value of small perks. Theme arising out of the review is the list of perks most likely to help workers feel valued by their employer to include things like ergonomics office equipment. According to Ian McDonald, commercial manager for Nespresso UK which supplies coffee machines to a growing number of Scottish businesses, it is also a low investment with more profit benefit. McDonald believes the ease of the range of Nespresso machines which have been especially residential for the commercial sector, along with the uniformity of the product, have been key factors in the enlargement in adopt by business customers in Scotland. Research gap: The jobs market continues to strengthen; staff retention is an increasingly important issue for employers. Relevance the workplace is one of the important factors of retention.

According to research paper published in (2014) "Leading a Concentric Ergonomic Culture to Achieve Multiple Returns." Agreeing to Pater, ergonomic principles of preventing cumulative trauma can be applied to overall security and to organizational change. On Jan 15, 2014, Robert Pater, managing director of SSA/Move SMART, presented In terms of ergonomics, cumulative trauma is generally caused by a pressure concentration on a body part during work activities and results in joint and strength weakness. When one's occupation involves continuous sitting, cumulative trauma can be prevented by periodically shifting positions during the day. Pater suggests that the most effective approach is to at the same time as move work closer to the worker and the worker
closer to his/her work, while also encouraging workers to take accountability for their own actions. Research about the how ergonomics benefited in the organization.

(2014) phrase, "Form must consider function" takes special meaning within the context of healthcare mobile carts and workstation As integral tools that can increase workflow efficiencies, positively impact the point of care and, in turn, improve the overall level of satisfaction of staff and patients, workstations must not simply fit within an organization's physical design and its functioning policies, but also appropriate the physical requirements of their users. Scott-Clark offers carts that are lightweight and have a low midpoint of gravity, said Bill Bzdek, COO. This allows for easy forward, recessive and lateral movement. The Armstrong Medical Premier cart line is all aluminum and 45% lighter than steel carts, minimizing end-user exertion. Even the most basic mobile cart can serve as a powerful tool at a healthcare facility. By offering a comfortable place to perform important responsibilities, the right cart can increase the production and happiness of your front-line supervises.

Hoff, Joseph S. Electrical Apparatus (2014): according to author Management commitment to a well-conceived program for ergonomics may contribute to the safety, health, and overall satisfaction of employees, resulting in higher productivity throughout an organization results that cannot go unheeded by business executives and managers. Job hazards may run the gamut, ranging from lifting heavy items, bending, reaching overhead, moving heavy loads, working in awkward positions, and performing identical or similar tasks repetitively. Once employees have identified hazards on the job, they need to
collaborate in devising and proposing responses to the hazards and risks.

Research Gap: The researcher more focuses on the manufacturing sector and productivity.

**Health Management Technology (2014)** Brief overview of the ergonomics considerations administrators should make when planning to integrate cart and workstations within their organization. Even the most basic mobile cart can serve as a powerful tool at a healthcare facility. By offering a comfortable place to perform significant farm duties, the right cart can raise the productivity and satisfaction of your front-line employees. Even the most essential mobile cart can serve as a commanding instrument at a healthcare facility. By offering a comfortable place to perform important tasks, the right cart can increase the productivity and satisfaction of your front-line staff.

**Jill Kelbs** article in the (2014) issue "Nuts and Bolts of Effective Ergonomics Programs" is a high-level summary of good, proven strategies of effective ergonomics program management. The six elements discussed have been proven through studies over the past ten years. However, some mixed uses of terms in the article may create some confusion, so researcher offers the following clarifications. Systems approach and program are two different things, but both terms are used throughout the article. As Kelb notes, "A systems approach views the ergonomics program as a system instead of a project." Agreed, the current systems approaches used by safety managers today (e.g., ANSI/ASSE Z10, OHSAS 18001, ISO 14001) are based on continuous improvement (Shewhart, 1986). Continued use of the term ergonomics
program is in contrast to this and other elements described. Effective organizations label their approach as an ergonomics process or, better yet, an ergonomic improvement process.

**Mansfield, Judith A; Armstrong, Thomas J (2014)** Author focus on worked on the implementation of an ergonomics program for controlling the risk of MSD and improving worker comfort and efficiency at the Library of Congress is discussed. Library work entails extensive handling of books and boxes, use of computer workstations, and typical workplace and preservation work. Between 1991 and 1994 ergonomic training was providing to approximately 1,400 office workers in two departments. The program included goal statements, organization commitments, and specification of program tasks. Employees have been cooperative and confirmed reasonable expectations and respect for management's attempts to get better their jobs.

**S Arun Vijay (2013)** To study the prevalence of the Work-Related Musculoskeletal Health Disorders (WRMSDs) among the Information Technology (IT) professionals working at selected IT industries in India. Study Policy: A cross-sectional design was implemented to study the pervasiveness of WRMSDs among the IT professionals in India. Materials and Methods: IT Professionals (N=300) belonging to the particular IT Industries placed at four cosmopolitan cities in India formed the population of this study. A Nordic musculoskeletal questionnaire was used to capture the popularity of self-reported musculoskeletal objections among the samples along with their associated Annual disability. A simple percentage technique with 95% confidence interval was adopted to study the prevalence of MSDs among the IT professionals. IT professionals reported that they had experienced some
form of WRMSDs in the past twelve months. Neck pain problems were the most frequently reported where thirty of the samples had experienced such problems in the past 12 months. Low back pain, wrists and hand pain and, the shoulder pain were the next frequently reported symptoms where the annual prevalence was reported as 25%, 14% and 13% respectively. Conclusion: The study concluded that the WRMSDs are widely reported among the IT professionals working in the IT industries in India and a suitable prevention strategy needs to be carried out in order to enable them to work comfortably.

La Bar, Gregg (2013) in this study said that employer seeking strategy for an ergonomics program should inspect the work of the ANSI's Z-365 committee. Some hundred experts on upper-extremity CTD have spent four years trying to craft a voluntary consensus standard that reflects the state-of-the-art but can be reasonably implemented. The paper is focus about the “do right thing” but the employees wear not aware about Ergonomics Practices followed by organizations. The research work talks about the Proposal of Occupational Safety and Health Administration and norms of ergonomics. Research focus was training aspects was lagging behind research also told employee to look another guideline provided by the American National Standards Institute's (ANSI) Z-365 committee.

The study of Baig Mansur Ibrahim, Dr.K.Tamizhj (2013) is emphasized on employees’ views on nature of job, wok environment and their present work postures at work. It interprets that employees of pouducherry manufacturing worry are provided with best working environment but they also face up to with works involving vibrations and static sitting postures for longworking hours. It reveals that employees are
somewhat fulfilled with the Present ergonomics at their workplace. The research reveals that employees confront wild problems of wrist pain, back pain and other health syndromes due to stagnant postures and repetitive and frequent bodily movements. The research has suggested various ways to improve workplace ergonomics of Indian Manufacturing Sectors.

Research Gap: The research focus on the ergonomics practices in Manufacturing Sector in Puducherry.

**Revati C. Deshpande (2013)** Researcher study aim to assess the ergonomics and its stress relating issues in banking sector in Gujarat. It was an effort to investigate potential interactions between physical and psychosocial risk factors in the workplace in banking sector that may lead to stress because of ergonomics. Improved personal control and comfort needs of employees trigger the concern among banks to provide them with a surroundings and office design, which fulfill the employees' requirements and facilitate to enhance their productivity. For this purpose, a questionnaire was draft and circulated to hundred banking sector staff and to measure the effects caused because of ergonomic factors which leads to stress and prolong exposure to such physical and psychological stress leads to serious exposure to physical and mental health of the bank employees. The findings of this study show that office design is very vital in terms of improvise employees' productivity. relaxed and ergonomic office design motivates the employees and increases their performance substantially.

Research Gap: The researcher study in Banking sector employees working in Gujarat.
Study of Mohd.Nasir Selamata and Mukhiffun Mukapitb(2013) may contribute to both workers and organizational in term of psychological well-being, physiological health and psychosocial wellness. Finally, appropriate participants approach in organization is essential for employees and the organization to achieve promotes quality performance and effective life. The present study indicates that implementing Physical Education at work is one of the strength approaches that can develop employees and organization performance.

Author Westover, Brian(2013) in their research paper study that along with the unique ergonomic keyboard is a wireless numeric keypad, providing ten-key functionality in a self-sufficient device at easy ergonomic design trendy "manta ray" design. Three-piece set offers flexible functionality. Wireless scheme cuts clutter lacking control USB port. The Microsoft Sculpt Ergonomic Desktop is a trio of computer peripherals designed to decreasesprain and get better your computer experience.

Philos. Technol (2013) Purpose of the research articles explores how the designed world could be better supportive of better public ways of relating. Theme arising out of the review researcher examines the contemporary and probable community ergonomics of the design of contemporary urban spaces and network devices. Researcher concludes that artifacts stay behind only one part of the image. A commonly ergonomic form of being requires not only compatible artifact and builds sitting room but also an institutional context supportive of community as a monetary and political entity.
Research gap: identified by the researcher the article is focus on the communal ways and practices on that not a majorly focus on Ergonomics practices.

Sanil, S K; Nair, Vinith Kumar; Ramanathan, Hareesh (2013) this study to bring out determine the essential factors of cognitive ergonomics and employee comfort. Authors focus on the Human factors and ergonomics that deal with fitting the job to the employee. Pleasant workplace conditions support the cognitive tendencies of employees. The researcher focuses on the well-being of the employee and only focuses the financial companies.

Research Gap: The researcher focus on the financial companies employees and their well-being.

Oodith, Devina; Parumasur, SanjanaBrijball (2012) This study aims to assess the impact of Sick Building Syndrome (layout, ergonomic design of workstation, lighting/ventilation, noise and aesthetics, health and performance) on the efficiency of Call Centre agents in organization customers and their needs. Theme arising out of the review study is has been undertaken in one public service call centre organization; the results of the study have internal validity in this institution. In order to enhance general incapability, it would be useful to undertake a similar study in other call centre environments in a variety of service surroundings in both the public and private sectors. This study also your workforce safer. A strong safety culture boosts productivity, employee morale and employee retention. includes a call centre surroundings where only inbound calls are made and hence, it would be useful to assess similar scope in an outgoing call settings as dialogue to someone
who has chosen to interact with you is completely different from speaking to somebody who was not expecting your interaction. Furthermore, it is valuable to assess the viability of open-plan offices in relative to the cognitive require of the tasks of employees.

Rachel Van Cleave, Jenna Osseck, Ashley Hartman, Deirdra Frausto, (2012) Says in their research that an ergonomics education needs assessment was conduct for a expediency sample of laborer in Northeast Missouri. Outcome verified that the respondent obsessed adequate ergonomics awareness but didn't seem to be able to apply their acquaintance to their daily work responsibilities. Trained ergonomics instructors, therefore, obtainable ergonomics intervention program educational workshops for those laborers and others who worked in jobs careful at high hazard for ergonomic-related injuries. Significant increases in pre- to post-ergonomics awareness were reported, and the majority of respondents also reported optimistic individual ergonomic behaviors in a threemonth post-intervention assessment.

To find out the impact of techniques and technology on performance Petra Marková, Rastislav Beňo, Karol Hatiar (2012) in their thesis quotes that Objective necessity becomes a CSR already at the companies' level, which is supported by the approach of the EU institutions and the Slovak Republic. One of the imaginable appliance through which we can contribute to the sustainability of CSR are supportable ergonomic programs. The first area is the Impact of technique and technology to employees at work, the second area is the Standing and impact of socially accountable HR in ergonomics and last area is the Creation of the work environment in relation to environmental sustainability. Ergonomic programs sustainability requires applying appropriate
methods for evaluation of their cost benefit and health effect. The predictable benefit of the application of sustainable ergonomic course in company practice is creating such Job conditions, where employees will be able to suggest the necessary work performance in a long term maintain standard.

Research Gap: The researcher focuses on the issue through Corporate Social responsibility and ergonomics program.

Charbel Jose' (2011) HRM, ergonomics and work psychodynamics: a model and a research agenda Purpose of the research Paper the objective of this paper is to introduce a dialogue between hypothetical frameworks that rarely have contact: human resource management, ergonomics and work psychodynamics. Although these three fields of knowledge highlight the human side of socially maintainable organizations, no previous study was identified that interrelated them. The theme arising out of the review contributes towards a systemic approach of such important themes, which the individual organism has as a common denominator, but whose links still require prospects research. As its main consequence, we record the need for a more in-depth accepting of the elements that act in the interface between the formal and prescribed organization and the comfortable, which stems from communal reality. An understanding of this relationship is necessary to building socially sustainable organizations. Findings - In light of the proposed model, it is possible to verify that Human Research Management, ergonomics and work psychodynamics have a energetic relationship that generates important theoretical propositions to be explored by future research.

Research gap: The research paper focuses on identified the relationship between the HRM & ergonomics and work psychodynamics. Research does not focus on the particular sector or Industry.
Peter Buckle (2011) this research investigated effects of shift systems on worker safety and health. Their findings confirm the current ergonomics shift-work suggestion. Researchers from the Netherlands received the 2011 Liberty Mutual Award for their systematic paper "Effects of the New Fast Forward Rotating Five-Shift Roster at a Dutch Steel Company." The Best paper Award promotes excellence in safety and health research. They early award recognizes the paper published in ergonomics that best contributes to the advancement of ergonomics. The results is especially meaningful for older workers.

Saklani, Alok & Jha, Shweta (2011) In their study they assess the increase in performance level of computer operators, Pre and Post Ergonomic manipulations. Findings of the study are impact of various ergonomic workplace settings (intensity of light, noise reduction, temperature control, etc.) on performance of computer operators. It was observed that these ergonomic interferences significantly enhanced job exactness although merely pretending ergonomic actions will not bring in the desired effect. Research work talks about the Experimental research on computer operator.

Research Gap: The research work talks about the Experimental research on computer operator but not in IT & Banking Sector.

Roth, Cynthia (2011) The researcher states that Ergonomics also must be included and seen as a value. It needs to be built into a corporate culture and be integrated into the whole thing any company does on an every day basis. The Author focus on after implementation of ergonomics in the organization perform job easier and keep.
Research Gap: Study focus on the productivity, employee morale and employee retention.

Zafir Mohd Makhbul, Syed Shah Alam, Shaza Marina Azmi and Norliza Abu Talib (2011) Work stress occurrences largely contribute to job dissatisfaction, burnout and retention ratios in many establishments. As in most literature review, deprived ergonomic workstation environment is among the major provider in stress outcomes such as somatic complaints and intention to leave. Thus, this study aims to examine the relationship between ergonomics workstation factors and the work stress outcomes in the Banking Supervision Department in the ABC Bank. Thirty-one (31) samples of the employees were derived from a population of sixty two (62) staffs in the Department by using proportionate stratified random sampling. Questionnaires were used for the data collections process. Findings from the study shows that the problems of body postures and health factors under the ergonomically designed workstation contributed to the work stress outcomes in the Department. These findings are supported by the multiple regression analysis where it depicts that both the body postures and health factors and component have significant relationship with the work stress outcomes in the Department. These findings however were inconsistent with the Pearson correlation analysis which showed that only the health factor has significant correlation with the work stress outcomes. In conclusion, the findings from this research are significant to the management and the organization as a whole to improve on ergonomic workstation factors on health and other ergonomic policies. Having a competent and healthy workforce will surely contribute to human capital development and the overall organization's success.
According to EHS (2011) Today volume IV It needs to be built into a corporate culture and beignet grated into everything any company does on a daily basis. While applied ergonomics is a relatively new branch of science - it celebrated its 60th anniversary in 2009 - it relies on research carried out in many other older, established scientific areas, such as engineering, physiology and psychology. A strong safety culture boosts productivity, employee morale and employee retention. Strong ergonomics integration prevents injuries and increases productivity. Together, they make the workplace safer and reduce costs.

Research Gap: The researcher focuses on the Ergonomic benefit and how it is important for corporate culture should implement for the employee. Not tapped any particular sector again research not done in India.

**Macedo, Angela C; Trindade, Carla S; Brito, Ana P; Socorro Dantas, M. (2011):** Purpose of the research articles study was conducted in an administrative department of a representative Portuguese enterprise, and encompassed sixty workers in charge of organizing industrial exhibition and cultural shows. Theme arising out of the review is data generated in this study confirmed the results obtained in similar studies—that a workplace health program is an efficient way to reduce ache insight of MSD’s among indicative office workers. in the face of being a first step, future research on a larger scale, and surrounding different activities, is urged to demonstrate that Portuguese workers may benefit from WFP as schedule practice in much the same way as Japanese, Americans and some European workers do—and with an eventually experimental cost-benefit ratio.

Research gap: The researcher focuses on the office workers in Portuguese enterprise particular company at outside India.
Akrouf QA, Crawford JO, Al-Shatti AS, Kamel MI (2010) "This cross-sectional observational study assessed the pattern of musculoskeletal disorders (MSDs) suffered by bank office workers in Kuwait. A self-administered authenticated questionnaire was used that included the Nordic musculoskeletal questionnaire survey and 12-item general health questionnaire (GHQ12). Of 750 employees, 80% suffered at least one episode of MSD during the previous year and forty two present suffered at least one stopping episode. The most affected body parts were the neck (53.5%), lower back (51.1%), shoulders (49.2%) and upper back (38.4%). Nationality, GHQ12 score, smoking and sex were important analysts of MSDs during the earlier year, while alcohol drinking, marital status, GHQ12 score, years in Kuwait and sex were significant predictors of disabling MSDs during the previous year.

Mallon, James (2010) in his Article published in Occupational Health and Safety, Environmental Studies find that view of ergonomics prevents company managers from benefit from what accurate ergonomics can do for them, their people and their profits. In this article it has been observed that companies begin to challenge the work-related musculoskeletal issue, they go through three stages of maturity: Reactive, Proactive and Advanced. This view of ergonomics prevents company managers from profiting from what true ergonomics can do for them, their society and their profits. This research work talks about view of ergonomics in US not define specific company or sector.

Sheng Lee; Wen-Ching Su; Yu-Syuan Wang (2010) focused on investigating the influence of the ergonomic design of laptops on users and mainly discussed the effect of tilt angle of laptops on the fatigue and soreness subjectively perceived by user. User individual perception of
fatigue and soreness was evaluated with the Borg’s CR-10 Scale. Five men’s and five women’s well-known with typewriting were selected for a test to evaluate their subjective perception of sleepiness and discomfort when typing under the conditions that the laptop tilted 0°, 10°, 15° and 20°. In addition, relation between sitting sight and the tilt of monitor screen (β) as well as influence of tilt angle (α) on heat emission are investigate. The laptop with a tilt angle of 15° had a better heat removing effect than the laptop with a tilt angle of 0°. The findings of the study will provide designers for creating new laptop computers in order to reduce the influence of the ergonomic design of laptops on users.

According to Harris, Benjamin,(2010) Workplace injuries and their associated costs particularly are burdensome as their impacts are wide ranging. For businesses, the impacts are practiced in areas of finance, productivity, and competitiveness and employee morale. For workers, household finances and quality of life are affected. In 2011, and in the afterward two decades, these impacts have the probable to be greatly magnified as an growing number of America’s baby boomers approach retirement age. Ergonomic program to produce meaningful results, it must have the full support of Top management.

The paper of Vincent G. Duffy (2009) provides a brief evaluation and reevaluation of recent articles and book chapters to give some insights into how efficiencies and patient safety can be better through human factors and ergonomics. It is my hope that you all will find motivation, theory that can be developed or built upon, and make offerings to sustain and facilitate growth for future human factors and ergonomics related research in healthcare and various other domains.
Shaliza Azreen Mustafa, Shahrul Kamaruddin, Zalinda Othman, Mohzani Mokhtar (2009) This study aims to evaluate the level of ergonomics awareness in Malaysian manufacturing industries and to determine the best observes of ergonomics program using Quality Function Deployment (QFD) between the manufacturing industries with the highest attentiveness of ergonomics. A questionnaire was developed and distributed to two hundred manufacturing industries where they respond rate was only 22.5%. Theme arising out of the review is evaluation showed that 35.6% of the industries were classified as having high level of ergonomics awareness, 51.1% with modest levels and 13.3% having low level of ergonomics awareness. The results from the EHOQ analysis showed that the orientation program was the best practice in assisting to increase the responsiveness of ergonomics between the employees. Besides, ergonomics need to be formalized via the creation of ergonomics team within the organization. This is based on the results where, 62.2% of the respondents agreed that organized ergonomics team will help to improve the awareness of ergonomics.

Research gap: The research paper is more focus on awareness of ergonomics in the Malaysian manufacturing industries.

Emile Tompa, Roman Dolinschi , Claire de Oliveira, Benjamin C. Amick III, Emma Irvin, (2009) reports on a systematic review of workplace ergonomic interventions with economic evaluation. The review required answering the question: what is the credible confirmation that incremental investment in ergonomic interventions is worth undertaking. Past efforts to produce evidence from this literature have focused on effectiveness, whereas this study synthesizes evidence on the cost-effectiveness/financial merits of such interventions. This article reports on a systematic review of workplace ergonomic interventions with
eco-nomic evaluations. The review required to answer the question: what is the trustworthy evidence that incremental savings in ergonomic interventions is worth undertaking? Past efforts to synthesize evidence from this literature have focused on effectiveness, whereas this study synthesizes evidence on the financial merits of such interventions. This review found strong evidence supporting the economic merits of ergonomic interventions in the manufacturing and warehousing sector, moderate evidence supporting the economic merits of such interventions in the administrative and support services sector, and health care sectors and limited evidence in the transportation sector. The research increase scope for researcher.

**Treppa, Benjamina (2009)** in their recent survey of safety professionals about ergonomics, training, the outcome an ergonomics standard could have on ergonomic injuries and other questions revealed some remarkable and unexpected answers. Ergonomic injuries, commonly known as MSD, are injuries that involve the muscles, spinal disks, tendons, joints, ligaments and nerves. The formal interviews were done with safety and health professionals from several states and companies that were contacted by the author and agreed to be interviewed on their personal opinion of ergonomics in the workplace. Training was the first issue deal with with the interviews and surveys.

**Koehl, Bradley, BSN, RN, COHN-S/CM, (December 2009)** Purpose of the research articles is this article describes a simple process occupational health nurses can use to augment their ergonomic assessment and evaluation activities. Theme arising out of the review is significant portion of U.S. employees are office based and their work is sitting. Office ergonomics is relevant to this population of employees to
minimize the injurious effects of stagnant or constant postures. Occupational health nurses currently conduct ergonomic assessments and provide interventions to decrease physical stressors. Office ergonomics and occupational health nursing is an outstanding match with the synergistic benefits to the employee and the employer exceeding the company's prospect of ergonomics only. Developing employees' awareness of their workstations and how to reduce risk factors associated with musculoskeletal injury can prevent injury, increase employees comfort and productivity, and bring a monetary return to the employer.

Research gap: The Research study shows that Workplace Injury and office Environment is correlated and financial benefit for employer.

**Seyed Abolfazl Zakerian Indra Devi Subramaniam (2009)** Increasing numbers of workers use computer for work. So, especially among office workers, there is a high risk of musculoskeletal discomforts. This study examined the associations among 3 factors, psychosocial work factors, work stress and musculoskeletal discomforts. These associations were examined via a questionnaire survey on 30 office employees (at a university in Malaysia), whose jobs compulsory an extensive use of PCs. The questionnaire was distributed and collected daily for 20 days. While the results indicated a significant relationship among psychosocial work factors, work stress and musculoskeletal discomfort, 3 psychosocial work issues were found to be more important than others in both work stress and musculoskeletal discomfort, job demands, negative social interaction and computer-related problems. To further develop study design, it is necessary to investigate industrial and other workers who have experienced musculoskeletal discomforts and work stress.
Rowh, Mark (2008) point out that as progress in ergonomics continues, the degree to which advance take embrace will depend on individual practices and organizational attitudes, not just hi-tech improvements. The Author focus on the office setting and work performed in the organization. The results have been positive. "The developers are pretty much young, healthy guys, and while the ergonomic equipment may benefit their physical health, researcher think the emotional and psychological benefits are even greater, Pritchett says. Everyone knows that ergonomic equipment is special and costs more than picking up something at the local used furniture store or warehouse. When employers go out of their way to make a statement about caring for the health and happiness of their employees and 'put their money where their mouth is,' the employees feel loved."

Research Gap: The researcher not targeting any sector just focuses and review ergonomics product. Giving tips about the ergonomics products.

The aim of Pater, Robert's (2008) study is ergonomic design and/or behavior modification is to create safer and more efficient performance, as well as boost worker satisfaction. Here are some ways to improve ergonomics: 1. Suggest that anyone with potential knee problems reduce their jumping and learn the best foot, knee and hip alignment to land as softly as possible. 2. Invite women on safety committees to become more actively involved in testing proposed tool or equipment changes. 3. Create an atmosphere where professionals, managers and bargaining unit and safety committee members are seeking out methods and equipment that promote effectiveness. High-level ergonomic thinking relies on seeing the specific issues of the work force and making needed adaptations. Create an atmosphere where professionals, managers and equipment that promote effectiveness. Be sure to work with your human
resources department (and in some cases, legal department) toward these ends.

Naderi, Babak; Baggerman, Madina. (2008) done research on demand of ergonomics. This emphasis on quality has steadily increased since that time; and so has the demand for ergonomics. For example, many human factors engineers and ergonomists are hired today to insure that "human errors" in the cockpit are minimized, that aircraft can be properly accessed and maintained, and that space missions are executed with ease, comfort and precision. Incertainty, there is no amount of legislation that can make ergonomics thrive or grow within an organization; legislation is simply not written with corporate profitability in mind. There will be companies that recognize improved quality and a reduction in production costs. A primary distinction of those companies will be the ability to recognize a potential for improved quality, apply the principles of ergonomics for achieving set goals, and measuring and documenting those improvements to quality.

Hendrick, Hal W (2007) says that Ergonomics to realize its full potential, it must integrate organizational design and management factors into its practice. Macro ergonomics is a sociotechnical systems approach to the overall design of work systems. Its goal is to achieve a fully synchronized work system with a design that complements an organization’s technology, personnel, and environment. Two years after implementing the program and making work system changes, a 70 percent reduction in lost time accidents and injuries had been achieved in both the production and distribution divisions of the company. Other benefits such as greater employee satisfaction and improvements in additional quality procedures also were attained. Given the present emphasis in
many organizations on applying ISO 9000, these results take on an even greater significance. The researcher focuses on the manufacturing industry.

The purpose of the paper of Roper, Kathy O; Yeh, Daniel C (2007) is to focus on obstacles faced by older workers in the workplace and provide three main ergonomics solutions designed to mitigate and prevent age-related injuries. Solutions presented include strategies for reducing extreme joint movement, reducing extreme pressure, and reducing repetitive tasks. Examples of engineering improvements, administrative improvements, and safety equipment additions are also offered. Practical implications—This paper provides ergonomic solutions and surveys the importance of providing effective workplace ergonomics for the elder worker. The examples demonstrated can be straight applied by facility designers and executives who wish to create safe and fruitful working environments. Originality/value—With an increasing percentage of older workers compromising that workforce, it is serious that companies and workstation managers make effective workplace ergonomics a topmost priority. The paper focuses on the role of the facility manager in implementing ergonomic solutions.

According to a recent study, of TimmDerek (2007) more than 89% of nearly 500 polled office workers reported feeling muscle tension or fatigue at least occasionally at the end of the workday; a full 16% feel this distress on a regular basis. In fact, the survey shows that adjustable desks and accessories not only relieve physical aches and pains for workers, but can also help alleviate management woes of low productivity. Liquid-crystal display computer monitors are another way that ergonomics can help improve worker comfort and production. Changes to
today's workstations can help increase productivity and worker satisfaction more than any new technological gadget.

According to HouHonglun, Sun Shouqian, PanYunhe (2007) ergonomics simulation system is studied based on some elements of ergonomics analysis and assessment. The virtual product development is the unified process of product design, evaluation and validation. Ergonomics investigation is the important step for product justification in the process, and the virtual human is key to the computer-aided product ergonomics. An ergonomics virtual human is built, which a unified framework is made up of biomechanics/physiology-based model, anthropometrical model, posture and motion model, task model, human reactions and decision-making model and social factor study model. The framework is applied to practical prototyping and virtual product development.

The research of Karin Lindgren Griffiths, Martin G. Mackey, Barbara J. Adamson (2007) exists relating to the potential health risks associated with computer work amongst semi-skilled occupations, there is a paucity of knowledge regarding the impact of an increasingly computerized workstation on the physical and psychological wellbeing of proficient occupations. These included epidemiological and experimental studies that explored the relationships among occupational demands and stressors, work behaviors and musculoskeletal health in workers operating in a computerized work environment.

Anshel, Jeffrey R. Professional Safety 51.8 (Aug 2006): 20-25. Purpose of the research articles is examines visual function and its role in workplace productivity. By understanding the connection between comfort, health and productivity, and expressive the options for good
visual ergonomics and workroom lighting, person who reads will gain a better understanding of potential visual stressors in the workplace, and of how vision and visual comfort can affect productivity. Theme arising out of the review is providing for good visual health for computer employees makes economic sense. Computers are used in almost every aspect of life, including work. Many users experience eye and vision-related symptoms and discomfort, which can negatively impact their productivity. Often, these problems can be addressed by using effective workstation design practices, providing adequate lighting and lighting control, and ensuring that employees receive appropriate eye care. Research gap identified by the researcher: The researcher focuses on the workplace productivity and link with the workplace comfort.

Curwick, Christy C, MPH; Reeb-Whitaker, Carolyn K, MS; Connon, Katherine L, (Nov 2003) Purpose of the research articles To determine whether the association conference was an appropriate setting for reaching managers with occupational safety and health information.

- To assess changes in managers' knowledge and ability to identify musculoskeletal risk factors following the training compared to before the training session.

- To determine whether the training provided managers with the necessary tools to identify risk factors in an actual manufacturing setting.

This information is important for occupational health nurses to aid not only in program evaluations, but also in expanding training efforts to broader audiences. Theme arising out of the review A partnership with an industry trade association was used to reach management with training focusing on ergonomics. The audience, consisting primarily of company presidents and senior managers, believed the industry association's
annual management meeting was an effective setting for safety and health training. The training was well received, and moreover, participants' knowledge of musculoskeletal risks and their perceived ability to identify these risks significantly increased as a result. Company tours held in conjunction with association conferences may be a useful way to apply what is taught in training. Occupational health nurses and other professionals should consider using trade association meetings as a setting for disseminating their research results and providing educational training.

Research gap: the study focuses on the Managers working in the manufacturing sector.

Keyserling, W Mulin, S S; Lincoln, A E; Baker, S (Sep/Oct 2003)

Purpose of the research articles The primary objectives of the detailed analyses were (1) To evaluate exposure to risk factors, and (2) when feasible to identify specific job factors (e.g., equipment, tooling, and work methods) responsible for excessive exposures. The findings of the detailed analyses were summarized in a series of one-page reports that included the following information. Theme arising out of the review: Are the results of job analyses performed by experienced ergonomists can also provide extremely valuable information. However, appropriate sampling strategies must be developed to assure that these analyses document both typical and peak exertions. For highly variable jobs such as those covered in this article, ergonomists should seek advice from on-site personnel to ensure that occasional work activities that expose employees to high levels of physical stress are not overlooked.

Research gap: The researcher focuses on the Automotive Industry employees.
Lin Grensing-Pophal (2002) discussed about ergonomically correct Position and how it is benefited for the employee to Prevent injuries and why so much emphasis is given on staff comforts?" There are firms around who have dealt with these issues for Fortune 500 and Fortune 100 companies. You really need professional help. "People really need to be aware of ergonomics desires in the workplace, number one to shelter their foot line, because their people are their No. one asset," Worthington emphasizes. If your people are injured and can't work, you can't meet member needs."

Anonymous: (Dec 2001) in the trade Journal The Author focus on the Chair Fitting, Monitor Position, Keyboard Position in the workplace. These guidelines are some basic suggestions to start injecting ergonomic solutions into the workspace. Since a large percentage of ergonomics is personal application, the ideal scenario is to hire a consultant to address the individual needs of a business. The researcher focuses on the Ergonomics Furniture not done research on specific industry or sector.

Emmons, Mark; Wilkinson, Frances C. Library Hi Tech 19.1 (2001): 77-87. Emerald Publication. This article applies learning theory and ergonomics principles to the design of effective learning environments for library instruction. It discusses features of electronic classroom ergonomics, including the ergonomics of the physical space, environmental factors and the workstation includes classroom layouts. The librarian designing a classroom has a magnificent opportunity to create a knowledge environment that serves the requirements of each student and the library instruction program. If you get the opportunity to build a classroom, take time to consider about how your students study. Appraise your instructional program. Look at how you design and teach
courses. Combine your knowledge of the local environment with sound learning theory and ergonomics principles, and you will create a classroom that will serve the needs of your students for many years to come. The researcher more focuses on the Library and Classroom for students ergonomically correct.

**Tapp, Linda M. Professional Safety 45.8 (Aug 2000):** 29-32. While application of sound ergonomic principles benefits all workers, the following actions can be considered when modifying a pregnant worker's job. Pregnant workers require extra attention with respect to potential ergonomic hazards that are either created or exacerbated by pregnancy. Thus, when pregnancy is first reported, the safety professional must work with the occupational nurse/physician, employee and her physician to assess these dangers. Appropriate spaces can prevent injuries, enhance the employee's well-being, and help her better handle the stress of work combined with the physical changes related to pregnancy. The researcher more focuses on the Pregnant Employees working Conditions.

**Sanil, S K; Nair, Vinith Kumar; Ramanathan, Hareesh (Dec 1998)** carried out study to determine the essential factors of cognitive ergonomics and employee well-being. Authors focus on the Human factors and ergonomics that deal with fitting the job to the worker. Coginal workplace conditions support the cognitive tendencies of employees. The researcher focuses on the well-being of the employee and only focuses the financial companies.

The Purpose of **Oxenburgh, MauriceS, (1997)** study is to find out a cost-benefit analysis method for calculating the cost of employment. The resolution of the analysis is to represent, in economic terms, the benefits
to health, productivity, and quality brought about by improved working conditions. The analysis can be used to measure the monetary benefits after the achievement of changes to working conditions, or it can be used to show the potential value of proposed expenditure (improvements to working conditions) and thus participate for resources on an equal grip with other enterprise offers. The cost-benefit analysis may also be used as sensitivity analysis to detect areas of high labor cost and/or productivity loss and thus to direct workplace improvements toward these areas, if appropriate.

Stuart-Buttle, Carol (Oct 1996) reviewed book of Stephen Pheasant named Ergonomics, Work and Health. The historical perspective, discussion of the scientific literature, and presentation of the complexity of risk factors for MSDs found in this book will be useful to anyone involved in ergonomics who wishes for deeper understanding and enlightenment. He focuses that application of ergonomics to preventive medicine and in particular the prevention of Musculoskeletal Disorder (MSDs).

Attaran, Mohsen IIE Solutions 28.6 (Jun 1996): 18. Costs, quality, productivity, barriers to ergonomics and implementation of ergonomics are discussed in detail Successful implementation includes worker involvement in suggesting improvements to the work process and environment. The firm must include employee inputs in the decision making process. A participative approach requires that the organization be open, that employees at all levels share the needed information, and that employees be trained to evaluate their workplace in terms of risks to safety and health.
2.2 REVIEW OF LITERATURE ON THESIS

"The Impact of Information Quality and Ergonomics on Service Quality in Banking Industry"

Purpose of the research:-

• This thesis investigates the impact of information quality and ergonomics on service quality in the banking industry. A model postulating that process quality predicts product quality was proposed
• To determine the impact of IQ on quality of service in the Banking industry.
• To determine the impact of ergonomics (noise, temperature, air quality, chair, the glare of lighting, and workstation such as a computer) on quality of service in the banking industry.

Theme arising out of the review:- In addition the result showed that accuracy and amount of information were related to overall service quality. Objectivity, timeliness, and believability were also related to the scopes of service quality. The results of ergonomics analysis presented that all of the dimensions of ergonomics (workstation, overall comfort, other, and environment) had a positive impact on overall service quality.

Research gap: This research sheds light on Banking Sector only and not only focus is Ergonomics Practices.

"Effect of Body Mass Index on Psychophysical Health of Computer Workers in a Developed Ergonomic Setup – A Descriptive Study"

Purpose of the research:- The objective of the study was to find out the effect of BMI on psycho-physical health (posture, flexibility, work related musculoskeletal discomforts and occupational stress of computer workers in a developed ergonomic setup.
Theme arising out of the review:- Work urgency, accuracy and demands compel the computer professionals to spend longer hours before computers without giving importance to their health, especially body weight. Increase of body weight leads to improper BMI, which may result in altered posture, reduce flexibility, and aggravate work related musculoskeletal discomfort and occupational-psychosocial stress.

Research gap: This research sheds light on Computers Users in BPO Company and Computers Users in Bangalore City. BMI in increasing of work posture, work related musculoskeletal discomfort, occupational-psychosocial stress and declining of body flexibility among computer workers in an advanced ergonomic setup.

**Ergonomics and women's work in the city of Toronto's case study of cashiers**

Purpose of the research:- This study examines how changing working conditions are linked to feminization of the retail workforce.

Theme arising out of the review:- The majority of cashier's are young women under the age of 25, many of whom still live with their parents. Although many cashiers suffer from musculoskeletal problems, particularly in the neck, shoulders, and lower back, most are not aware of ergonomic risks. They view their jobs as convenient, temporary employment. Managers in these views by recruiting informally and through their preferences for a young women workforce that is easy to train and less likely to suffer injuries. Young female emerge as the ideal flexible workforce, adaptable and trainable workers willing to work for low wages as needed.

Research gap: This research sheds light on Women employee in retail workforce cashiers in Toronto grocery stores.
The ergonomics and organizational stress relationship

Purpose of the research: This study examines ergonomics and its potential to alleviate organizational stress and other personal and work outcomes, specifically somatic complaints, job induced tension, general fatigue and job dissatisfaction directly and through perceptions of person-environment fit and perceptions of control.

Theme arising out of the review:- Findings indicate positive relationships between ergonomic design (adjustable chair, wall color, work area design) and ergonomic training (training satisfaction, training understanding) with person-environment fit. Likewise, findings reveal positive relationships between ergonomic design (adjustable chair, work area design) and ergonomic training (training satisfaction, training understanding) with control. Person-environment fit and control fully mediated the relationship between training satisfaction and job dissatisfaction, while partially mediating the relationship between work area design and job induced tension. Findings support evaluating the individual components of ergonomic design and training separately.

Research gap: This research sheds light on Ergonomics is becoming an increasingly important practice to the workplace. Ergonomics involves adapting jobs and workplaces to the worker. The economic implications of ergonomics involve medical cost reduction, less absenteeism and higher worker productivity.

The prevention of injuries in manufacturing utilizing ergonomic interventions

Purpose of the research:- This dissertation will examine the implementation of five process improvement interventions in nine United States manufacturing companies, to determine if the implementation of
the interventions affected the number and costs of injuries for the companies in the study.

Theme arising out of the review:-The study was conducted in two phases. The first phase involved a twelve-year study of a Midwest manufacturer of mobile vehicles. The second phase involved a five-year study of eight automotive manufacturing companies in various cities in the United States.

Research gap: This research sheds light on every year in the United States millions of workers are injured in workplace accidents and billions of dollars are spent to care for them. Research conducted in Midwest in USA.

Studies on Product Design using Ergonomic Considerations

Purpose of the research articles:-It is vital to find best design elements to visualize the product which possesses the appearances not only to satisfy the users but also decreases fatigue and injury during prolonged use.

Theme arising out of the review:-Embedding ergonomic consideration into product/machine/equipment/component design in addition to work location taking into account both psychological and physical needs of user helps to enhance user efficiency, satisfaction and productivity. The study also analyses a kinematic model of human upper arm extremity to diagnose comfort arm posture that allows the operator to have a comfort work zone within which possible postures can be accepted.

Research gap: This research sheds light on work environment taking into account both psychological and physical needs of user helps to enhance user efficiency, satisfaction and productivity.
Kaizen and Lean Thinking Approaches To Ergonomics: A Focus On Aging People

Purpose of the research:-The main focus of this research is to evaluate the Kaizen and Lean thinking philosophies applied to ergonomics for the aging people, and to provide a methodology that may help organizations analyze the changes necessary to accommodate the older worker. From the aging individuals' standpoint, the quality of life achieved during their active years moves them to continue working beyond the age of sixty-five years. Interacting with other people and being continuously motivated at the job site may contribute to their quality of life.

Theme arising out of the review:-The present research is based on government studies for aging people, mainly in the U.S.; the process of aging analysis on previous research and on geriatric and gerontology studies; and social studies on aging people. It is also based on the psychological impacts of aging and retirement, ergonomics or human factors information available regarding human aging and the diseases that come with it.

Research gap:-This research sheds light on the content of this research is confined to introducing the most common changes that the human goes through when aging according to medical and ergonomics information. It also involves studying the concepts of Kaizen and Lean, and their possible applications to ergonomics for the workplace, particularly for aging people.

Methodology to Simultaneously Address Organizational Needs With Respect To Quality, Ergonomics And Safety.

Purpose of the research:-The objectives of this dissertation project were:

1) To identify most important organizational requirements and needs for simultaneous improvements in the area of quality, safety and ergonomics.
2) To integrate the identified organizational requirements and needs with quality, safety and ergonomics management systems. The purpose of the study is to lay the foundation for more rigorous scientific procedures that will be used to develop software for the integration of quality, safety and ergonomic management systems that will minimize system procedures by utilizing a multifunctional team for quality, safety and ergonomic improvement activities simultaneously.

Theme arising out of the review:- This study therefore proposes a model for single coherent management system that integrates quality, ergonomic and safety (occupational and health and natural environmental) to improve efficiency and productivity.

Research gap: This research sheds light on foundation for more rigorous scientific procedures that will be used to develop software for the integration of quality, safety and ergonomic management systems that will minimize system procedures.

**Ergonomic Studies Pertaining to the Design of Human Cnc-Machine Interface**

Purpose of the research:- To evaluate performance in a human-CNC machine interaction environment considering anthropometric, cognitive, age and sex aspects. To design a CNC machine which is reliable in operation and safe, To develop an ergonomic database for effective and efficient human-CNC machine interface.

Theme arising out of the review:- This study is all about understanding how the anthropometric factors affect performance in a human-CNC machine interface environment. Historical evidences suggest that many of the injuries in manufacturing are musculoskeletal disorders caused by cumulative trauma The study targeted the CNC machine system, keeping in view the exponential development of the automation nowadays, and the use of CNC machines in manufacturing and scheme. The performance measurement system designed for the study may be
replicated for other fields where schemes are operated through regulator panels and also where responses of emotionally retarded human-beings (or the human beings with the symptoms of Alzheimer disease) are to be observed and evaluated. In addition to theoretical relevance, it has practical relevance too. The study is relevant for the Machine Tool Industries to plan/implement accordingly, the strategies and actions regarding design of CNC machines and their interfaces.

Research gap identified by the researcher: This research sheds light on CNC machines and human-CNC machine interfaces should be ergonomically designed, the CNC machine system and their interfaces be designed, the ergonomic design affects performance of the human beings.

**Economics and Ergonomics Of Silk Processing Activities - Impact On Meitei Women In Manipur.**

Purpose of the research :-

- Study the work participation of women in silk processing activities.
- Analyse the economic impact of the jobs.
- Relate the ergonomic impacts of the tasks.
- Locate possibilities for social and ergonomic intervention.

Theme arising out of the review:- Ergonomically none of the workers enjoyed good work place. Posturewise all activities were found to bedemanding as the workers were found to adopt awkward postures to perform the tasks. There were no major physical health problems but work related body discomforts were complained by maximum of the samples. Loin loom weavers (45%) had put in more experience in weaving than the other two groups in work related musculo skeletal diseases. In the risk evaluation Body Discomfort Scale and Rula were used.
Research gap identified by the researcher: This research sheds light on the work participation of women in silk processing activities, Relate the ergonomic impacts of the tasks.

2.3 LITERATURE REVIEW ON BOOKS


Purpose of the Book:-The purpose of this handbook is to provide all employees with information to reduce personal injuries and professional sicknesses associated with computer usage. This guide is a revision of the Computer User's Handbook published in March 1997.

Theme arising out of the review:-Scope This guide redirects general industry safety rules that promote safe workstations for employees who exertion at computers by:

(a) Informing employees on ways to adjust a computer workstation to maintain the body in a neutral position.

(b) Notifying employees of protective measures such as appropriate work habits and exercises to relieve tension associated with computer use.

This handbook is not proposed to require that every computer user be supplied furniture, equipment, and accessories for their workstation. Purchases are subject to individual department approval processes and budget constraints.

Safety in manufacturing Ergonomics Awkward Posture

Purpose of the Book:-Mention the Guide lines about the Risk Factor and Contributing Factor.

Theme arising out of the review:-Controls for injury preventionShort-term: 1. Change workstation layout to minimize twisting. 2. Raise or lower
work surfaces and storage spaces to eliminate or minimize reaching, bending, and kneeling. 3. Provide proper seating, such as stools, for low level or kneeling work. Long-term: 1. Provide powered hand tools instead of manual tools. 2. Make sure new equipment and machinery are adjustable to allow for changing work actions and products. 3. Teach workers how to work within neutral ranges of motion.

**Ergonomics and human factors at work.**

Purpose of the Book: This book is aimed at owners, managers and others and will help you recognize ergonomics and human factors in the workstation. It gives some examples of ergonomics problems and simple, effective advice about how to solve them.

Theme arising out of the review: In some industries, such as major hazards, defence and transport, ergonomics is also called 'human factors'. This leaflet helps to explain how spread over ergonomics can progress health and safety in your workstation.

Ergonomics is a science concerned with the 'fit' between people and their work. It puts people first, taking account of their abilities and restrictions. Ergonomics aims to make sure that tasks, equipment, information and the environment fit each worker.

**Ergonomics guidelines for occupational health practice in industrially developing countries**

Purpose of the Book: Representatives of the International Commission on Occupational Health (ICOH) and the International Ergonomics Association (IEA) have jointly compiled these guidelines. They are designed to assist personnel in the field of occupational health who have limited
knowledge of ergonomics. They outline the process of identifying, assessing and controlling problems related to health and safety in the workplace. The ultimate aim is that they can provide assistance in planning basic intervention strategies based on sound ergonomics principles.

Theme arising out of the review:- Ergonomics can play an important role in occupational health and safety management where the primary aim is to reduce risks of injury or disease while enhancing the quality of working life.

**Office Ergonomics ROI6 Essentials for Large Employers**

Purpose of the research articles:- The Cost of Poor Ergonomics, Profits of Noble Ergonomics, Limitations of Old-fashioned Ergonomics Processes, There is a Better Way six Components of an Effective Ergonomics Process, Ergo Advocate.

Theme arising out of the review:- Ergo Web is also effective method in implementing organization and will get benefited.

**Handbook of Human Factors and Ergonomics Methods**

Purpose of the Books:- The main aim of this handbook is to provide a broad, commanding and practical account of human factors and ergonomics methods. It is intended to encourage people to make full use of human factors and ergonomics methods in system design. Research has suggested that even professional ergonomists tend to restrict themselves to two or three of their favorite methods, despite variations in the problems that they address (Baber and Mirza, 1988; Stanton and Young, 1998). If this book leads people to explore human factors and ergonomics methods that are new to them, then it will have achieved its objective. The page constraints of this booklet meant that exposure of the
main areas of ergonomics had to be limited to some eighty three methods.

Theme arising out of the review:-The handbook is divided into six sections, each section representing a specialized field of ergonomics with a representative selection of associated methods. The sequence of the sections and a brief description of their contents are presented in Table 1.2. The six sections are intended to represent all facets of human factors and ergonomics in systems analysis, design, and assessment. Three of the methods sections are concerned with the individual person and his or her interaction with the world (i.e., physical methods, psychophysiological methods, and behavioral-cognitive methods). One of the methods sections (Section IV) is concerned with the social groupings and their interaction with the world (i.e., team methods). Another of the methods sections (Section V) is concerned with the effect.

**Ergonomics in the Classroom: Position for Learning**

Purpose of the Book:-Promoting full inclusion in educational environments often includes knocking down simple physical barriers by building up everyone's skills and knowledge of the principles of ergonomics and understanding of assistive technology solutions. This presentation will identify ergonomic challenges present in the classroom environment and will provide solutions that can assist with improving posture and enhance the student's ability to focus on learning and promote inclusion.

Theme arising out of the review:-

1. Promote full inclusion of all students in educational environments.
2. Increase participants skills and knowledge in assistive technology and ergonomics.

3. Provide resources for participants so they can educate others and create inclusive classrooms and educational settings.

Office Ergonomics-A Guide to Creating a Safe Office Environment

Purpose of the Book:-This information is protected under U.S. copyright laws as an unpublished work, and is confidential and proprietary to Maine Employers' Mutual Insurance Company. You are not to duplicate or copy this document in whole or in part without the express written permission of the Loss Control Department of Maine Employers' Mutual Insurance Company.

Theme arising out of the review:-Improper use of office equipment can be detrimental to the health and well-being of your body. The “Stretch Break” sidebar will clarify how the stretches is to be accurately executed during your crowd or personal stretching routine. New Concepts Develop in this Book

Ergonomics: The Study of Work

Purpose of the Books:-You need to know about ergonomics if you are an employer or an employee in the manufacturing, construction, maritime, and agricultural industries and you or your employees' work activities and job surroundings include:

• Reciting the same motion throughout your officeday,

• Working in awkward or stationary positions,
Lifting heavy or awkward items,

Using excessive force to perform tasks, and

Being visible to excessive vibration or

Extreme diseases.

Theme arising out of the review:- OSHA publishes booklets and fact sheets detailing agency policy and regulations. Creating Awareness about the Ergonomics among employees and employer Implementation in industries. Develop healthier Environment in the Organizations.

**Ergonomic checkpoints**


Purpose of the research articles:- Practical and easy-to-implement solutions for improving safety, health and working conditions. The aim is to design and use a locally adapted checklist made up of selected borders. Such a checklist can be an authoritative tool for ergonomic assessment and progress of existing working conditions. As the checkpoints compiled in this manual represent readily applicable workplace improvements, the ergonomic

Theme arising out of the review:- The book give overview about the Ergonomics Checklist which is going to implement Practically in the Organization.
E Health and Remote Monitoring

Purpose of the Book:- eHealth initiatives, many of which are being undertaken in countries around the globe, have myriad benefits, including improvement of synchronization and integration of well-being care delivery, authorization of individuals and families for helping them manage their own health better and prepare health care plans, and facilitation of public health initiatives.

Theme arising out of the review:-This book gives an overview of the impact of eHealth systems on access to health care, quality of information on health care, profitable of well-being care services and the progress of eHealth equipment.

Managing the causes of work-related stress: A step-by-step approach using the Management Standards

Purpose of the Book:-This book is aimed primarily at organizations that employ 50 or more people, but smaller businesses may also find it helpful. It is aimed at managers or staff with responsibility for managing the potential causes of work-related stress in your organization. That might be the person who has responsibility for coordinating your stress risk assessment, human resources managers, health and safety officers, trade union representatives or line managers.

Theme arising out of the review:-The Management Standards describe a set of conditions that reflect high levels of health, well-being and organisational performance. Following the advice in this book will support you to identify the gap between what is trendy in your organization and these ideal conditions. It will also help you develop solutions to close this gap.
Seating at work

Purpose of the Book:- It is aimed at those responsible for health and safety at work. It may also be useful to employees, manufacturers, designers, suppliers and users of industrial and office tables. Seating in vehicles and mobile plant is not covered; information on this can be sought from the HSE booklet In the driving seat.

Theme arising out of the review:-This guidance gives advice on how to ensure that spaces in the office is safe and appropriate. It also gives examples of good practice, including information on seating design and selection.

Health risk management

Purpose of the Book:-This booklet has been prepared to help the owners and managers of small and medium sized enterprises to control health risks arising from work. It is based on evidence and experience gained by HSE, and actual case Readings are used to illustrate particular points. Management needs to be competent to deal effectively with occupational health risk.

Theme arising out of the review:-Each year more people become ill as a result of their work than are killed or injured in industrial accidents. While most sicknesses caused by work do not kill, they can include years of pain, suffering and discomfort for those affected. This might include musculo-skeletal problems, respiratory disease, dermatitis and noise induced hearing loss.
Working with display screen equipment (DSE)

Purpose of the Book:- These Regulations only apply to employers whose workers regularly use DSE as a significant part of their normal work. These workers are known as DSE users. These Regulations do not apply to workers who use DSE infrequently or for short periods of time. However, the controls described in 'By what method to control the risk' may still be useful for these workers. Theme arising out of the review:- Some workers may experience fatigue, eye strain, upper limb problems and back pain from overuse or unsuitable use of DSE. These problems can also be experienced from poorly designed workstations or work environments. The causes may not always be obvious and can be due to a combination of factors.

2.4 REVIEW ON BUSINESS ERGONOMICS NEWS

- **Indian office interiors are now based on ergonomics**
  For those who spend full time in office, the line between household and office space keeps getting thin with each passing day. This has less to do with the office interiors and more with the number of hours you spend at your workplace. But with a immediate rise in the startups, a whole new cohort of young entrepreneurs has come up. And, these young business minds prefer office places that are designed keeping in attention the ergonomics, giving way to innovative and remarkably designed offices. Tushar Mittal, the founder and Managing Director of Studiokon Ventures - a business interior company, talks to us about what makes the Indian corporate houses look so dreary, the difference between interiors of Indian offices and their western counterparts and the future of corporate designs.
• Bengaluru's work culture stands up for an ergonomical change

Mark Zuckerberg, for the most part, runs the world's largest social network standing. Leonardo Da Vinci stood up to proposal his many improvements and great work, including the Mona Lisa. Ernest Hemmingway liked to write standing and so did Charles Dickens. A number of offices are waking up to the benefits of vertical while at work, while more as a precaution against the downsides to sitting long hours -- it's the new 'smoking' -- than for production gains. Catching up with the trend established by Yahoo and Google in the urban, many firms in Bengaluru are providing employees standing workstations, even if these can be a tad classy. Infosys, Cisco, Robert Bosch, Linkedin, Bang the Table, Ittiam Systems, Mapbox, In stamojo, and Decathlon.

• No such thing as an ergonomic chair

Every day 9 am to 9 pm employee spends in the office there's a dull ache in your neck, shoulders and upper back. you grit your teeth and keep working on your computer. you must get that ergonomic chair fast, you think. Afterward all, it will be the end of those professional aches, right? you couldn't be more wrong. in reality, there's no such thing as an ergonomic chair, says dr deepak sharan, specialist orthopaedic surgeon. dr sharan is the only computer related damages specialist in bangalore. he has observed several cases of cri among professionals who spend many hours occupied on the computer. He has also seen a lot of them fall prey to the mythos of an ergonomic chair.

"by definition, ergonomic equipment is a very scientific concept. it is supposed to cater to exact body dimensions," says dr sharan. since every person has a altered body size and obligation, no one chair can be
classified 'ergonomic' and passed off as suitable to all."the answer is in modifiable equipment that can be operated according to needs," he adds.most of these chair manufacturers might be selling so-called 'ergonomic' chairs to colleges and offices. In most cases they are not changeable, and when they do have an adjustment handle, users do not have knowledge of how to use it."that is the biggest problem in schools and workplaces now. because there is low awareness about ergonomics, schools are getting cheated into purchasing furniture that isn't really ergonomic," says dr sharan.at schools, a student of std 7 uses the same chair as a schoolchild of std 12. their sizes might be diverse but they usage the same chair when they work at the computer.with a lot of schools focussing on being computer savvy today, some have gone to the extent of buying swivel chairs too. "but swivel chairs with hand rests and cushions make no difference whatsoever." as a result, some of dr deepak sharan's youngest patients pain from cri are aged 7.and the age goes up to as young as 18 years. but besides the fresher population in bangalore falling prey to the myths of ergonomics, professionals are also complaining. in bangalore, at smallest of professionals are distress from cri today.

- **Ergonomics is not just about the office chair, but also about the science of arranging workplaces to suit employees.**

Say the word 'ergonomics' and the first thing that pops into the mind is an office chair. It is true that the applied science deals with seating and office furniture, but it is much more than that. At a workplace, its scope also contains lighting, high temperature, noise, storage and the human itself.
Exercises at the desk:

1) Sit or stand upright. Short of stimulating the chin, glide head straight back while waiting for you feel the stretch. Hold and count to 10. Repeat 3-5 times.

2) Dewdrop head slowly to one lateral, taking ear towards take on until you feel the elasticity. Hold and count to ten. Repeat 3-5 times.

3) Sitting with the back sustained, slowly roll shoulders up and towards the back in circular motion. This workouts the shoulder Repeat 10 times.

- Senate to Debate Killing Ergonomics Rules --- Many Firms, Meanwhile, Struggle on How to Implement Them

Insurance companies that provide workers' compensation insurance to businesses say they are likely to raise premiums, if the rules stay in effect. GuideOne Insurance Co., Des Moines, Iowa, has scheduled a symposium in mid-March to brief its executives on the rules, so that they can inform customers and help them set up ergonomics programs. The company expects to hire a dozen ergonomicsexperts, on top of its current one. The cost of such services, and the expected increase in insurance claims, could mean a 10% to 14% rise in annual premiums, says Bill Shackelford, GuideOne's workers' compensation administrator. "We would continue offering insurance but all costs would get pushed back to people who pay the premium. Employers will pay the added costs and employees won't get the raise they expected."

These are among the arguments that are being made by business lobbyists on Capitol Hill, as lawmakers consider a resolution to kill the rules. Under the Congressional Review Act, Congress can nullify the rules if a simple majority in both the Senate and the House vote to do so
and President Bush signs off on it. Led by Sens. Don Nickles (R., Okla.) and Mike Enzi (R., Wyo.), the Senate is expected to begin 10 hours of debate today, with a vote likely to follow late tonight or tomorrow. The supporters of the resolution say they have the required number of votes, as well as Mr. Bush's support, to kill the rules. Union opponents have said they will continue to fight to maintain the rules.

**Ergonomics Regulations Under Fire**

A coalition of 230 companies and trade groups known as We Care -- for Washington Employers Concerned About Regulating Ergonomics -- is writing a bill, and has raised more than $300,000 to finance a lobbying assault on the 2001 Legislature and prepare a court challenge in case that fails. The group's argument is that the rules will be extremely expensive to implement, and then might not even be effective.

The rules, adopted by the Washington Labor and Industries Department in May and set to be phased in over six years, will require employers to identify jobs that are at high risk for such repetitive-stress injuries as carpal tunnel syndrome, tendonitis and back strain, and then to take steps -- from buying new equipment to offering ergonomic-training programs -- to lower the risk for such ailments. Gov. Gary Locke's office says the agency is simply fulfilling a responsibility granted by the Legislature. Joe Dear, the governor's chief of staff, says lawmakers delegate rulemaking authority because the details of drafting regulations are best left to technical experts of government agencies. "When legislators can't agree on the details," he says, "they throw the work to the bureaucracy."
GERMANY: Daimler Trucks presents future virtual 3D ergonomics simulation for trucks at 2015 CeBIT

According to Richard Sauerbier, who works in ergonomics research at Daimler, there is a need to develop this previously static system further: "Paralleled with a passenger car, studies into the ergonomics of a truck cover a much wider field.

- U.S. Mulls Ergonomics Guidelines, Offers No Time Frame for Action

In a hearing on the ergonomics problem before the Senate labor assumptions subcommittee, Labor Secretary Elaine Chao provided few details on how her agency will proceed with implementing a innovative policy to protect employees against monotonous strain and other musculoskeletal injuries on the work. But her spokesman Stuart Roy said that in recent discussions on the issue, Ms. Chao has mentioned the possibility of issuing voluntary guidelines.

Spurred by business opposition to the rules, Congress last month voted to block implementation of workplace ergonomics standards that had been approved by former President Clinton after more than 10 years in the making. The standards, which would have covered about 102 million U.S. workers at 6.1 million work sites, would have required job conditions and workstations to be tailored to help workers avoid repetitive strain and other injuries. Businesses had complained that the standards weren't based on science and that implementation would have been prohibitively expensive.
• **Ergonomics Rule Provokes Face-Off Before Congress**

Republicans, led by Sen. Don Nickles of Oklahoma and Sen. Michael Enzi of Wyoming, could introduce a resolution to disapprove the ergonomics standard in the Senate "in the next few weeks," says Coy Knobel, Sen. Enzi's press secretary. Under an expedited review process, a simple majority of senators would need to approve the action within 60 session days of the regulation's promulgation on Jan. 16, giving the Senate until approximately mid-May. OSHA has said it will not begin enforcing the ergonomics rule until Oct. 15.